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71 Applicant: **CARADON MIRA LIMITED** (formerly
 Walker Crosweller & Company Limited)
 Whaddon Works Cromwell Road
 Cheltenham Gloucestershire GL52 5EP(GB)

72 Inventor: **Beck, Nicholas John**
 "Gwynfa" 81 Gloucester Road Tewkesbury
 Gloucestershire England GL25 5SS(GB)

74 Representative: **Knowles, Audrey Elizabeth**
 624 Pershore Road
 Selly Park Birmingham B29 7HG(GB)

54 Adjustable spray fitting for ablutionary appliances.

57 The invention concerns spray fittings typically used for showers and spray handsets. A handset 1 for connection to a water supply line has a handle 2 and a head 3 mounting the spray fitting 4 having a rotatable control member 6 by which the spray discharged may be varied. An inlet mounting 10 provides the main inlet for water and supports the control member 6 and other parts. A spray plate 5 has two sets 45,50 of outlet holes with each set being associated with separate outlet chambers 38,43 to which the flow of water from a main inner chamber 30 is controlled by a poppet valve 31 arranged to co-operate with seatings 36,41 of respective ports opening to each outlet chamber 38,43. The poppet valve 31 is arranged to be moved axially on rotation of the control member 6 whereby water discharged through the fitting may have spray directed through the outlet holes from either one or both of the outlet chambers. Various features of the valve arrangement to prevent pressure differentials being developed are described as well as features directed to providing a compact assembly.

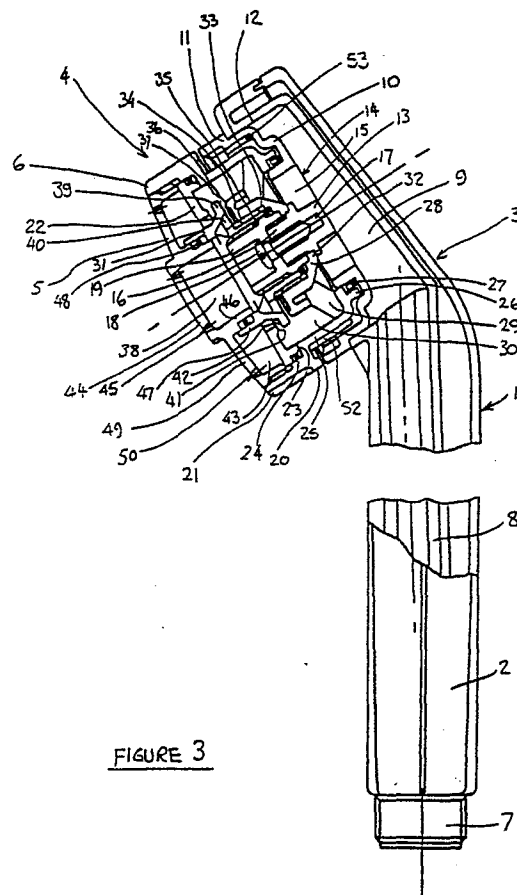


FIGURE 3

ADJUSTABLE SPRAY FITTING FOR ABLUTIONARY APPLIANCES

This invention concerns adjustable spray fittings for ablutionary appliances, particularly but not exclusively, spray fittings for showers and spray handsets.

Spray fittings in which the spray can be changed are already known, and adjustable spray fittings have commonly been used in mains pressurised hot water systems where the water pressure to the fittings is high, often as much as 15 times greater than in a typical low pressure domestic installation where the water pressure is derived from a header tank system.

There is an increasing demand for high flow rate showers which can discharge large volumes of water greater than in the past, and this can only be achieved in such typical low pressure installation by the modification of the installation to include a pump for shower pressurisation. However, although a high flow rate shower is acceptable for many people, it has the disadvantage of using more water, even more than a normal bath, and is not economic.

Accordingly, it is desirable that a spray fitting be provided that can be used for high flow rates as well as for a lower economic flow rate whilst being operable at the relatively low water pressures as found in such typical installation without pressurisation by pump.

Although adjustable spray fittings are known for mains pressurised systems, these are designed for operation at such high pressures with small waterways permitting small and simple designs that cannot be applied to spray fittings operable at low water pressures wherein the size of the waterways for the same flow volume are considerably greater.

It is an object of this invention to provide an adjustable spray fitting wherein the flow rate from the spray can be varied from a high rate to low by manual adjustment of the fitting and which is operable at low water pressures.

It is a further object of this invention to provide an adjustable spray fitting that is of compact construction and that can be applied to a wide range of ablutionary appliances such as a shower with a fixed shower head, a body shower with one or more fixed spray heads, a handset spray either for a shower, or a body shower, hair washing or perianal use.

Other objectives of this invention will become apparent from the description later herein.

According to this invention we provide an adjustable spray fitting for an ablutionary appliance, the fitting comprising an inlet mounting for communication with a water supply line, a control member supported on the inlet mounting for rotation relative

to the inlet mounting, a spray plate carried by the control member and defining first and second outlet chambers each outlet chamber having an array of outlet holes for the discharge of water, a valve member mounted in the control member for limited axial movement on rotation of the control member between a first seating and a second seating, said first and second seatings being associated with first and second ports opening from a chamber in the control member to the respective first and second outlet chambers, and the valve member being operable on axial movement by rotation of the control member to control flow through said first and second ports whereby water discharged through the fitting may have a spray directed through either one or both of the outlet chambers by selective adjustment of the control member.

The invented spray fitting is arranged to have two separate discharge or outlet chambers each with their respective array of holes so that on operation of the valve member the water is directed to one or other of the outlet chambers as selected by simple rotation of the control member. Thus, the spray pattern and/or type of spray may be adjusted by the selection of the outlet chamber by controlled operation of the valve member.

Preferably, the spray plate has a first series of outlet holes associated with the first chamber and a second series of outlet holes associated with the second chamber that are differently arrayed and different to the first series. In this way different discharge as a selected spray can be obtained by rotation of the control member to effect axial adjusting movement of the valve member to engage either the first seating for discharge through the second series of outlet holes or the second seating for discharge through the first series of outlet holes.

It is also preferred that the size of said first and second outlet chambers be different in volume so that for a given flow rate of water into the spray fitting and by the design of the first and second series of holes, the spray pattern and/or type of spray on adjustment may vary from a high flow rate to an economy rate.

Typically, the series of outlet holes of the first chamber may be less in number than those of the second series so that the force of the spray discharged from the first chamber is greater than that from the second chamber.

In addition, the valve member may be adjusted in an intermediate position wherein both the first and second ports are open so that water may flow from the chamber past the valve member into both

the first and second outlet chambers whereby maximum flow may be discharged through the fitting to obtain a full drenching high flow rate spray.

Conveniently, the second outlet chamber is concentric to the first outlet chamber and the valve member is a poppet valve mounted for axial displacement between the first and second seatings which are annular concentric faces spaced axially apart with the valve member being adapted for respective engagement with the first and second seatings.

In one arrangement the valve member has a head providing opposed annular seal faces for respective engagement with the first and second seatings. The valve head with its co-axial and concentric form of the seal faces on the head enables water pressure affects to be minimised to enable the valve to be adjusted to the selected operative positions during use of the spray fitting.

In another arrangement the valve member has an O-ring seated in an annular groove for respective engagement with the first and second seatings. The opposed sidewalls of the groove are preferably outwardly inclined to enable the O-ring to deflect on engaging a respective seating to accommodate excess travel of the valve member while maintaining sealing engagement with the seating. The elasticity of the O-ring allows it to return to its original position on movement away from the seating and the self-adjusting action of the O-ring minimises stressing of the seatings and/or valve member during use of the spray fitting.

Preferably, the inlet mounting provides a central boss to which the control member and spray plate are mounted by a retainer that also mounts the valve member for axial movement relative both to the retainer and the control member carrying the spray plate.

By this arrangement, a compact arrangement and assembly can be achieved, with all of the main component parts being co-axially and concentrically arranged relative to a single central boss of the inlet mounting.

Advantageously axial free play of the control member is accommodated by resiliently biasing the control member. The biasing is conveniently provided by a corrosion resistant compression spring, for example a stainless steel disc spring washer, acting between the inlet mounting and the control member. The spring force produced keeps the control member lightly tensioned so that it is quite easy to adjust but will not rattle.

Conveniently, the valve member may be mounted for axial displacement relative to the control member by inter-engaging spline formations on the valve member and the control member, and the valve member being mounted on the retainer with

inter-engaging thread formations that cause axial displacement of the valve member when the control member with the valve member are rotated relative to the retainer.

Again, such an arrangement is compact for the spline formations and thread formations permit axial movement of the valve member on rotation of the control member which rotates the valve member through the inter-engagement of the spline formations.

In a preferred arrangement of the invented spray fitting, the inlet mounting is of annular form with the control member being mounted thereon by a hub mounted on the boss of the inlet mounting by the retainer, and the control member having an outer peripheral flange formed with recesses for manual engagement for use in rotating the control member for adjusting the spray fitting.

Preferably, the inlet mounting and peripheral flange of the control member have co-operating stop faces to limit rotational movement of the control member.

It is also preferred that the spray plate is received and mounted within the peripheral flange of the control member remote from the inlet mounting.

Other preferred features of the invented spray fitting will be referred to and described later herein.

The invented spray fitting has many applications for various kinds of ablutionary appliances, and in a fixed shower, the inlet mounting may be connected to an inlet chamber formed in the water supply pipe connection leading to the spray fitting. In a shower with a handset connected to the water supply pipe by a flexible pipe, then the inlet mounting may form part of the handset and be mounted in the handset with an inlet chamber being formed or provided within the handset.

The invented spray fitting may be utilised in the other ablutionary appliances such as body sprays or peri-anal washing devices and the adjustable spray fitting can be used as an alternative to the conventional fixed spray plate.

The invented spray fitting has been particularly designed with its special construction and type of valve member to accommodate a wide range of water supply pressures, and to operate under a wide range of conditions appertaining to domestic and other water installations.

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings wherein:-

FIGURE 1 is a side elevation of a shower handset incorporating a spray fitting according to the present invention;

FIGURE 2 is a detail plan view of the head of the handset and the spray fitting depicted in Figure 1;

FIGURE 3 is an enlarged detail sectional view taken substantially on the line 3'-3' of Figure 2 with the valve member shown in an intermediate position;

FIGURE 4 is an enlarged detail section similar to Figure 3 of a modified form of the handset and spray fitting depicted in Figure 1 with the valve member shown in an intermediate position; and

FIGURE 5 is an enlarged detail section similar to Figure 4 with the valve member shown in a limit or end position.

The shower handset 1 depicted in Figures 1 to 3 of the accompanying drawings comprises a handle portion 2 for holding or supporting the handset, and a head portion 3 offset with respect to the handle portion 2 and mounting the spray fitting 4 that has a spray plate 5 and a rotatable control 6 for use in adjusting the spray.

In known manner, the handset would be connected to a water supply line through a flexible hose (not shown) by means of a threaded boss 7 at the end of the handset remote from the head 3. The handle portion has an internal passageway 8 for water through which water flowing from the shower device (not shown) would be conducted to an inlet chamber 9 of the spray fitting 4. The temperature control or mixing of the water would be done by any suitable means associated with the shower device, and the control and supply of water to the handset is not a feature of this invention.

In the spray fitting 4, there is an inlet mounting member 10 of dished annular form of which the outer flange 11 is seated within complementary walls 12 of the head portion 3 and is secured or bonded thereto in a watertight manner. The member 10 has a central boss 13 connected to the outer flange 11 by radial webs 14 between which there is an inlet passageway 15 leading from the inlet chamber 9 in the head 3.

The boss 13 has a spigot portion 16 projecting towards the spray plate 5 and the spigot has a threaded closed bore 17 receiving a set screw 18 which secures an annular retainer member 19 to the spigot 16. The retainer member 19 is held in place by the screw 18 and assembles the control member 6, the spray plate 5 and other parts to the inlet mounting 10.

The control member 6 is generally of annular form received within the inlet mounting 10 and has an outer peripheral flange 20 which is formed with finger grip recesses 21 around its outer surface. The flange 20 is formed with an internal thread with which the threaded outer peripheral edge of the spray plate 5 is engaged to secure the control member 6 and spray plate 5 together. An annular seating ring 22 is held between the spray plate 5 and an internal shoulder 23 of the control member 6 with an O-ring seal 24 therebetween.

The control member 6 further includes an inner flange 25 extending within the dished part of the inlet mounting 10 with the flange 25 having an annular rib 26 projecting towards the mounting 10 and enclosing a lip seal 27 between the mounting 10 and the control member 6 to maintain the two parts in sealed engagement on use and rotation of the control member 6 relative to the mounting 10.

The control member 6 has a central hub 28 that is connected to the inner flange 25 by radial webs 29 that provide therebetween an entrance from the inlet passageway 15 into a chamber 30 from which the flow of water is controlled by a poppet valve 31. The control member 6 is located on the spigot 16 of the mounting 10 by an internal lip 32 of which one side abuts the shoulder formed by the webs 14 of the mounting 10 with the other side of the lip 32 being engaged by one end of the retainer 19 secured to the mounting 10 by the screw 18.

The hub 28 of the control member 6 has an internal spline 33 which is engaged by a splined inner annular wall portion 34 of the valve 31 for axial sliding movement of the valve 31 relative to the control member 6. The annular wall portion 34 extends between the hub 28 and the retainer 19, and the outer cylindrical surface of the retainer 19 has a fast thread formation 35 which is engaged by complementary thread formation on the annular wall portion 34. The valve 31 is thereby mounted on the retainer and the hub 28 of the control member 6 so that on rotation of the control member 6, the valve 31 is moved axially along the splines by the translated rotary movement due to the fast thread 35.

The control member 6 has an inner annular flange extending from the hub 28 that provides a first annular seating 36 for co-operation with a first annular seal face 37 of the valve 31 controlling a first port leading from the chamber 30 to a first outlet chamber 38 associated with the central portion of the spray plate 5. The annular seal face 37 of the poppet valve 31 is provided on an annular head 39 connected by radial webs 40 to the inner wall 34 of the valve, and when such first port is open as shown in Figure 3, the water may flow between the webs 40 into the first outlet chamber 38.

The inner marginal edge of the seating ring 22 provides a second seating 41 for co-operation with a second annular seal face 42 formed on the head 39 of the valve 31 controlling a second port leading from the chamber 30 to a second outlet chamber 43 associated with the outer portion of the spray plate 5.

The spray plate 5 has a central circular spray portion 44 formed with an array of first outlet holes 45 that lead from the first outlet chamber 38 which is separated from the second outlet chamber 43 by an internal partition wall 46 integral with the spray plate. The valve 31 has an outer annular wall 47 extending from the rim 39 which engages over the partition wall 46 with an O-ring 48 therebetween to seal the first chamber 38 from the second chamber 43 during axial movement of the valve 31.

The spray plate has an outer annular spray portion 49 formed with an array of second outlet holes 50 that lead from the second outlet chamber 43. The first outlet holes 45 are designed to provide a coarse or strong spray pattern of water from the centre of the spray plate 5 whilst the second outlet holes 50 are designed to provide a finer or more dispersed gentler spray from the spray plate.

The first outlet chamber 38 has a smaller volume than the concentric second outlet chamber so that for the same inlet water pressure, the flow rate through the respective first and second outlet holes will be different even if the outlet holes are of the same dimensions.

The raised formation 51 on the outer face of the spray plate 5 intermediate the series of first and second outlet holes is designed and adapted for use with a tool (not shown) for extracting or inserting the spray plate 5 relative to the control member 6 as required for assembly or servicing.

As will now be understood from the foregoing description of the component parts and construction of the spray fitting 4, the poppet valve 31 is designed and arranged to be controlled by rotation of the control member 6 by the user who may rotate the control member 6 by means of the finger grip recesses 21 either before or during use of the spray fitting.

The degree of rotation of the control member 6 relative to the inlet mounting 10 is limited by respective stop faces 52 and 53 on the control member 6 and on the inner face of the flange of the inlet mounting 10. The positions of the stop faces are chosen to limit movement of the control member 6 so that the permitted degree of rotation of the control member corresponds to the extreme limits of axial movement of the valve 31 between the first and second seatings 36 and 41. A limit of 120° rotation is considered suitable, and the limit stops prevent over stressing of the valve and other components.

In use of the invented spray fitting, the water flows into the inlet chamber 9 in the head 3 and thence through the inlet passageway 15 into the chamber 30.

In the position of the control member 6 as shown, the valve 31 is in an intermediate position wherein both ports are open so all pressure is substantially balanced and no axial forces are exerted on the poppet valve.

By turning the control member 6, the poppet valve 31 is closed onto the second seating 41 so that the first port is open providing a throughway into the first chamber 38 to direct water through the first outlet holes 45. The water pressure in the chambers 30 and 38 act on the head 39 of the valve 31 to hold same in sealing engagement with the second seating 41 so that water is prevented from flowing into the outer second chamber 43 and all of the water flows through the first smaller chamber giving the strong spray selected.

Water pressure in the respective chambers 30 and first outlet chamber 38 also acts on the valve between the co-axial diameters of the seat 41 and valve wall 47. These faces are arranged so that any pressure differential produces only a low axial force on the valve to avoid the poppet valve 'locking on' when engaged with the second seating 41.

To change the spray mode, the user may turn the control member 6 and as this is turned, the valve 31 is displaced axially as it rides up the thread 35 of the retainer 19 confined by the splines 33. The axial forces acting on the poppet valve are relatively low, as just explained, and do not impede operation of the control member 6 and the poppet valve 31. The valve 31 is moved so that the second valve seal face 42 is displaced away from the second seating 41 to open the second port leading to the larger second outlet chamber 43.

At the intermediate position as shown in Figure 3, before the control member 6 has been turned to engage the respective stops 52 and 53, both first and second ports may be open to permit water to flow into both the first and second outlet chambers for a maximum drenching spray pattern of water. The concentric and co-axial seatings and seal faces defining the first and second ports are so arranged that no high axial forces act on the poppet valve 31, and the valve 31 can be maintained in a selected intermediate position by mere frictional forces arising in the fitting between the relatively movable parts and the seals.

By completing the turning of the control member 6 to the stop or limit position, the valve 31 is displaced so that the first seal face 37 of the valve engages with the first seat 36 to close the first port to prevent water from going into the central first outlet chamber 38 and to control water spray through the outer outlet holes for a fine or light spray. In this limit position, any axial forces acting

on the valve are low as the water pressure in the respective chambers 30 and 43 act on the valve between the co-axial diameters of the seat 36 and the internal partition wall 46.

This special feature of the design of the valve to limit development of high pressure differentials within the spray fitting is important for it enables the spray fitting to be used with a wide range of water inlet pressures whilst accommodating relatively large waterways within the fitting sufficient for operation at low water pressures in typical domestic water installations with a header tank.

The use of a poppet valve with its opposed sealing faces that are swept by the water flow through the fitting also ensures that the risk of debris or the like being trapped in the fitting is avoided and a self-cleaning operation of the valve is achieved, particularly as the closure of the valve sealing faces onto the respective seatings will prevent build up of scale or other deposits common in hard water supply areas.

Referring now to Figures 4 and 5 of the accompanying drawings, there is depicted a modified form of the shower handset and spray fitting above-described. For convenience, like reference numerals are used to indicate parts of this modified form corresponding to the parts of the handset and spray fitting above-described.

In this modified form of the handset 1 and spray fitting 4, the inlet mounting 10 is of annular form seated wholly within the wall 12 of the head portion 3 with an O-ring seal 54 therebetween and the peripheral flange 20 of the control member 6 is co-extensive with the wall 12.

The central hub 28 of the control member 6 is mounted on the spigot 16 of the inlet mounting 10 with a disc spring washer 55 located between the internal lip 32 of the control member 6 and a collar 56 integral with the spigot 16.

The washer 55 which is made of stainless steel or other suitable corrosion resistant metal acts as a short stroke compression spring producing a spring tension that keeps the control member 6 lightly tensioned. In this way, the control member 6 can be turned relatively easily for operating the spray fitting yet will not rattle.

For engaging the selected seating 36,41 to close the associated port for directing the discharge of water through either the first outlet holes 45 or the second outlet holes 50, the poppet valve 31 has an O-ring 57 in place of the integral head 39.

The poppet valve 31 is constructed from two plastics parts 31a,31b which are welded or otherwise secured together to define an annular groove 58 in which the inner marginal edge of the O-ring 57 is located with the O-ring being lightly stretched.

By this arrangement, the opposed sides of the O-ring 57 provide the first and second sealing faces 37,42 for engagement with the first and second seatings 36,41 respectively on axial displacement of the poppet valve 31 by rotation of the control member 6 to one or other of the limit positions determined by the engagement of the limit stops 52,53.

The groove 58 is of V-shape in transverse cross-section with the opposed sidewalls outwardly inclined relative to one another in the direction from the base of the groove 58. In this way, on engagement with either seating 36,41, the O-ring 57 can deflect by sliding up the opposite sidewall of the groove 58 as shown in Figure 5 to absorb excess travel of the poppet valve 31, and the elasticity of the O-ring 57 allows it to be pulled back into the bottom of the groove 58 when the poppet valve 31 is displaced axially towards the other seating.

Such excess travel may occur where the axial displacement of the poppet valve 31 as permitted by the limit stops 52,53 does not coincide with the engagement of the O-ring 57 with the seatings 36,41, for example due to manufacturing tolerances, and by this arrangement, overstressing of the components of the spray fitting is avoided in a simple manner having particular benefit when such components are made of plastics materials.

In other respects the construction and operation of this modified form of handset and spray fitting is generally similar to the embodiment of Figures 1 to 3 with the spray fitting being adjustable on rotation of the control member 6 to provide discharge through either the first outlet holes 45 or the second outlet holes 50 at the limit positions of the poppet valve 31 or through both the first and second outlet holes 45 and 50 at an intermediate position of the poppet valve 31 as previously described.

As will now be appreciated, the spray fittings as just described are only exemplified by reference to the application to a handset for a shower. By suitable design of the inlet mounting and the fitting to a water supply pipe, the principle of the invented spray fitting can be applied to a wide range of ablutionary appliances where water is discharged through a spray or rose fixture. The invented spray fitting can be used with a high pressure water installation and can be applied to other installations incorporating a boost or pump for "power" showering, and in this regard, it is important to emphasise the special design features which avoid the development of high forces acting on the valve from the water pressure, and thus the spray fitting may be used not only for the relatively low water pressures but also for other water installations.

Although the control member in the exemplary embodiments is intended to be rotated by the user, other means for rotating the control member may be employed, such as a control knob projecting through a shield or the like.

In the exemplary embodiments, the spray plate is an integral component, but the spray plate may be an assembly of an outer annular spray plate with one type and array of outlet holes with the spray plate having a central circular plate assembled thereto with a different type and array of outlet holes. By such an arrangement of a multi-part spray plate, then a range of spray plates for different applications may be generated by selection of the desired combination of inner and outer plates.

The spray plate may incorporate a pulsator device which can be mounted in one of the outlet chambers and be driven by the water pressure or water flow. Commonly, such pulsator devices include a form of swirler or turbine or vaned member which is rotatably mounted and rotated by the water flow. The action of the rotation of the member causes the flow to be interrupted and results in intermittent bursts of water through each outlet hole giving the sensation of pulsation. This kind of pulsator may conveniently be mounted in the central chamber 44 of the embodiments depicted in the accompanying drawings. However, such pulsator devices are varied, and it is envisaged that any common pulsator devices of the type mentioned could be incorporated in the spray head or assembled in or to the spray plate.

The advantages and other features of the invented spray fitting will be understood by those skilled in this field, and the simplicity and compactness of the exemplary embodiments is self-evident from the accompanying drawings, and it will be understood how this invented concept can be applied to a wide range of ablutionary applications.

Claims

1. An adjustable spray fitting (4) for an ablutionary appliance (1) characterised in that the fitting comprises an inlet mounting (10) for communication with a water supply line, a control member (6) supported on the inlet mounting (10) for rotation relative to the inlet mounting (10), a spray plate (5) carried by the control member (6) and defining first and second outlet chambers (38,43) each outlet chamber (38,43) having an array of outlet holes (45,50) for the discharge of water, a valve member (31) mounted in the control member (6) for limited axial movement on rotation of the control member (6) between a first seating (36) and a second seating (41), said first and second seatings (36,41)

being associated with first and second ports opening from a chamber (30) in the control member (6) to the respective first and second outlet chambers (38,43), and the valve member (31) being operable on axial movement by rotation of the control member (6) to control flow through said first and second ports whereby water discharged through the fitting (4) may have a spray directed through either one or both of the outlet chambers (38,43) by selective adjustment of the control member (6).

2. The fitting according to Claim 1 characterised in that the spray plate (5) has a first series of outlet holes (45) associated with the first outlet chamber (38), a second series of outlet holes (50) associated with the second outlet chamber (43) and, the first and second series of outlet holes (45,50) are either differently arrayed or different.

3. The fitting according to Claim 1 or Claim 2 characterised in that the first and second outlet chambers (38,43) are of different volume.

4. The fitting according to any one of the preceding Claims characterised in that the valve member (31) may be adjusted to a position in which both the first and second ports are open so that water may flow from the chamber (30) past the valve member (31) into both the first and second outlet chambers (38,43).

5. The fitting according to any one of the preceding Claims characterised in that the second outlet chamber (43) is concentric to the first outlet chamber (38) and the valve member (31) is a poppet valve (31) mounted for axial displacement between the first and second seatings (36,41) which are annular concentric faces spaced axially apart with the poppet valve (31) being adapted for respective sealing engagement therewith.

6. The fitting according to Claim 5 characterised in that the poppet valve (31) has a head (39) providing opposed annular seal faces (37,42) for respective engagement with the first and second seatings (36,41).

7. The fitting according to Claim 5 characterised in that the poppet valve (31) has an O-ring (57) the opposed sides of which provide annular seal faces (37,42) for respective engagement with the first and second seatings (36,41), the O-ring (57) being located in annular groove (58) formed in the poppet valve (31) with the opposed sidewalls of the groove (58) inclined outwardly relative to one another in the direction from the base of the groove (58).

8. The fitting according to any one of the preceding Claims characterised in that the inlet mounting (10) comprises a central boss (13) to which the control member (6) and spray plate (5) are mounted by a retainer (19) that mounts the

valve member (31) for axial movement relative both to the retainer (19) and to the control member (6) carrying the spray plate (5).

9. The fitting according to any one of the preceding Claims characterised in that spring means (35) such as a disc spring washer (55) acts between the control member (6) and the inlet mounting (10) to tension the control member (6).

10. The fitting according to any one of the preceding Claims characterised in that the inlet mounting (10) is of annular form with the control member (6) being mounted therewith by a hub (28) mounted on a boss (13) of the inlet mounting (10), the control member (6) has an outer peripheral flange (20) formed with recesses (21) for manual engagement for use in rotating the control member (6) for adjusting the spray fitting (5) and, the inlet mounting (10) and control member (6) have co-operating stop faces (52,53) to limit rotational movement of the control member (6).

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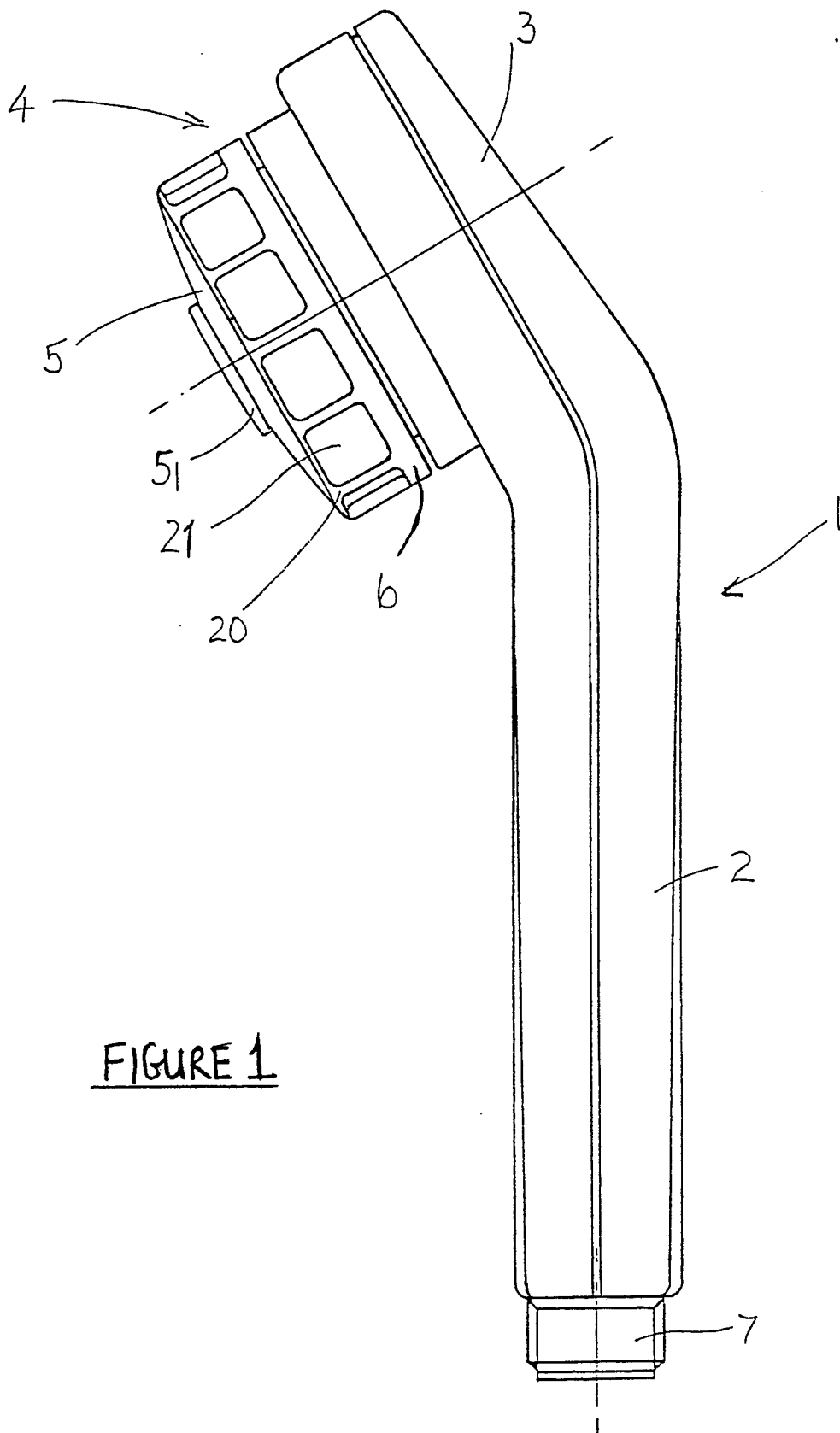


FIGURE 1

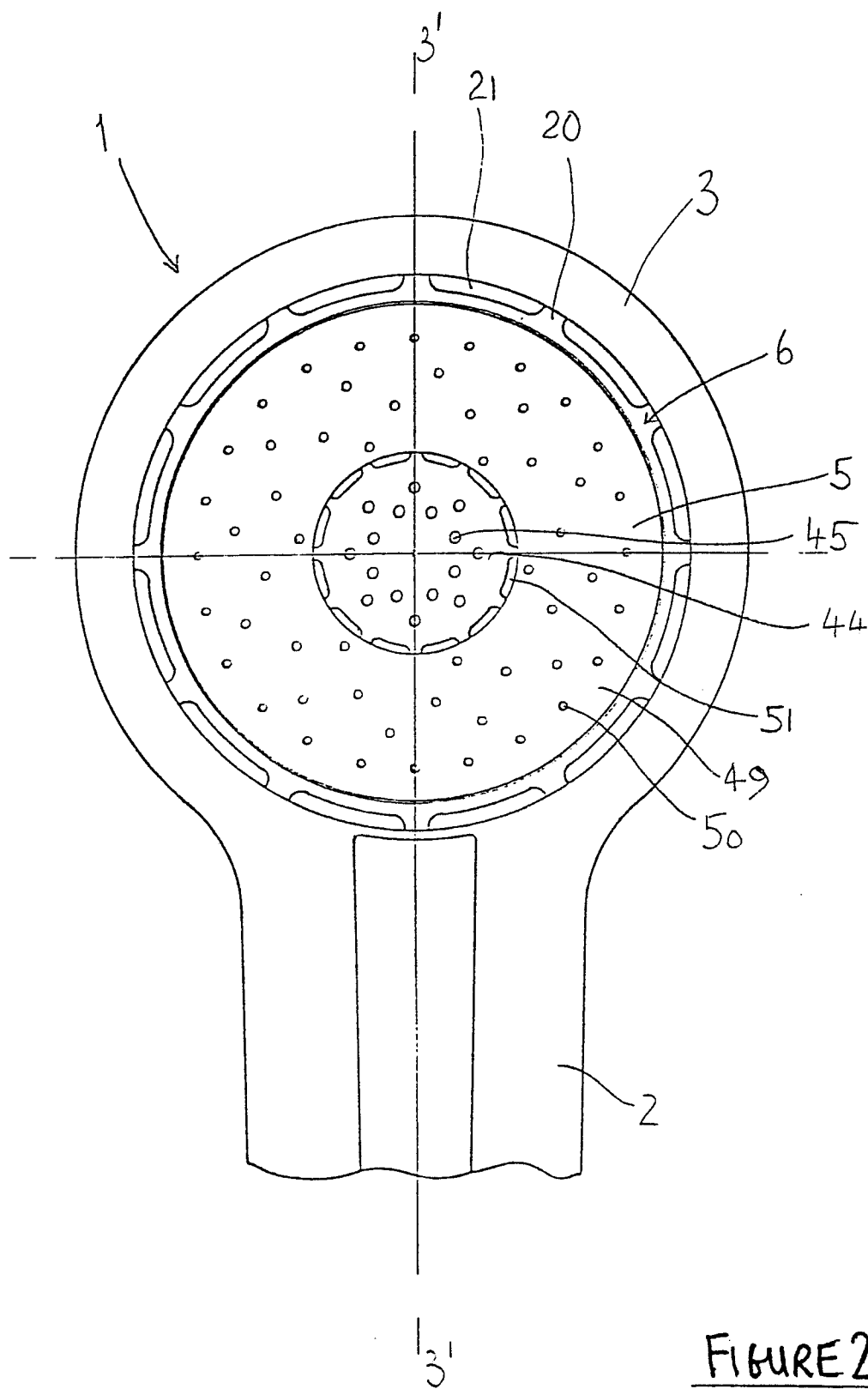


FIGURE 2

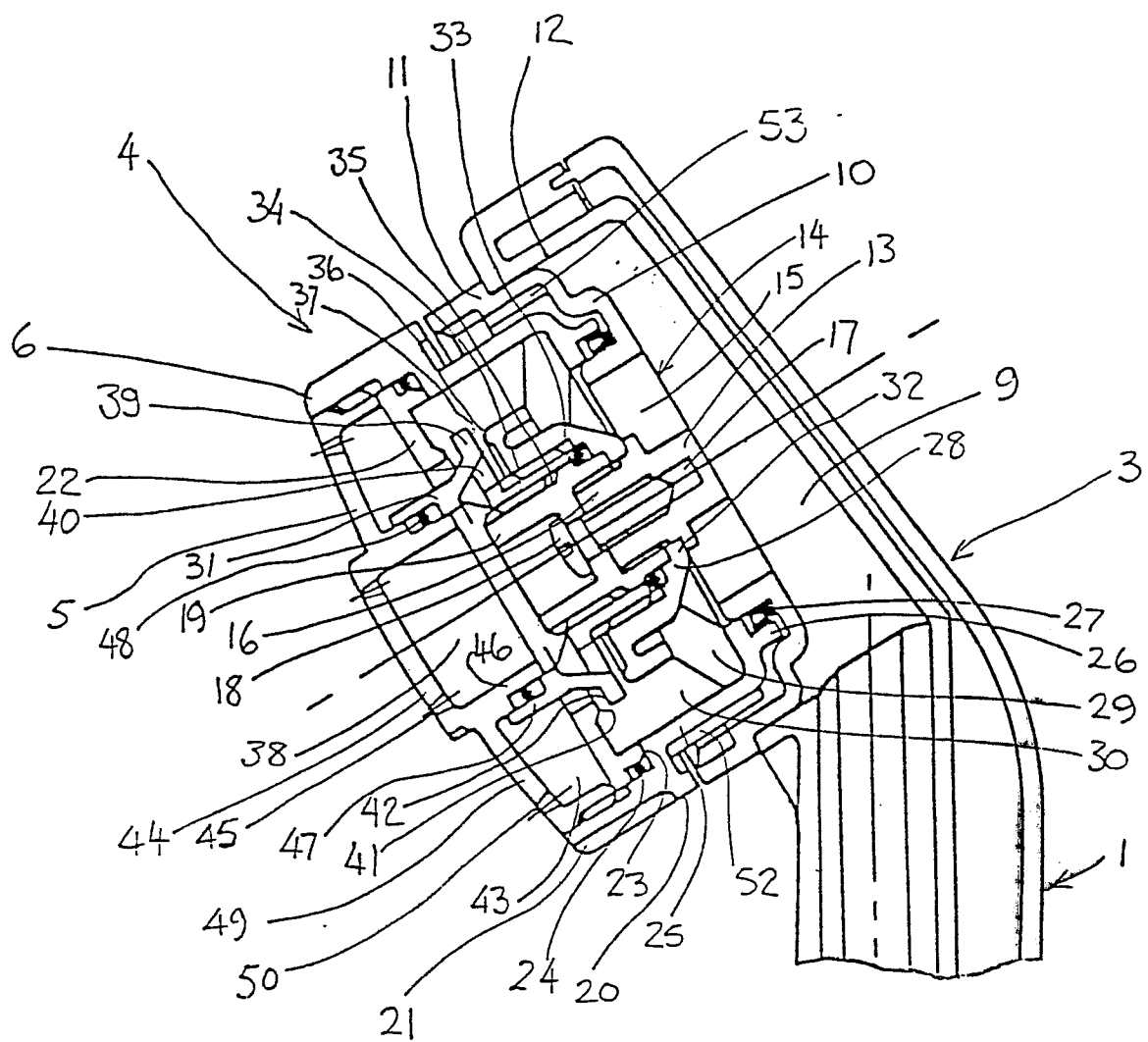


FIGURE 3

